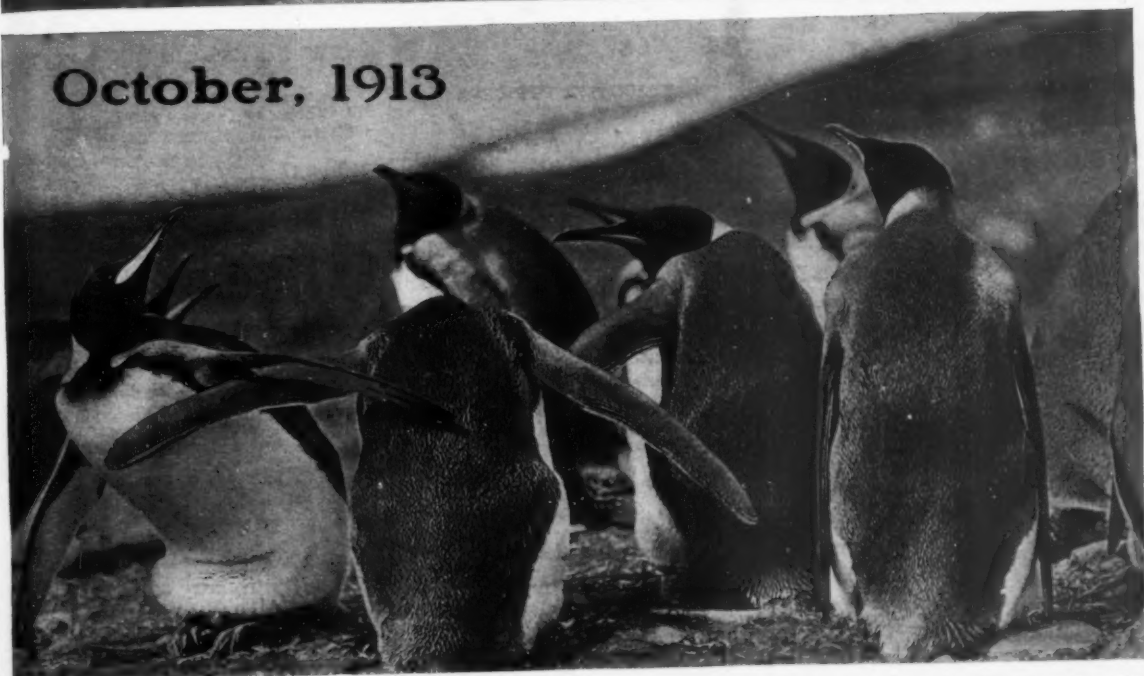


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The American Museum Journal

October, 1913



A Desolate Island of the Antarctic

South Georgia, the greatest whaling grounds of the world, the former haunt of the fur seals and at present the home of sea elephants and penguins

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MARY CYNTHIA DICKERSON, *Editor*

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Photo by J. I. Wilson

"BEACH MASTER" WITH A SMALL HERD OF COWS

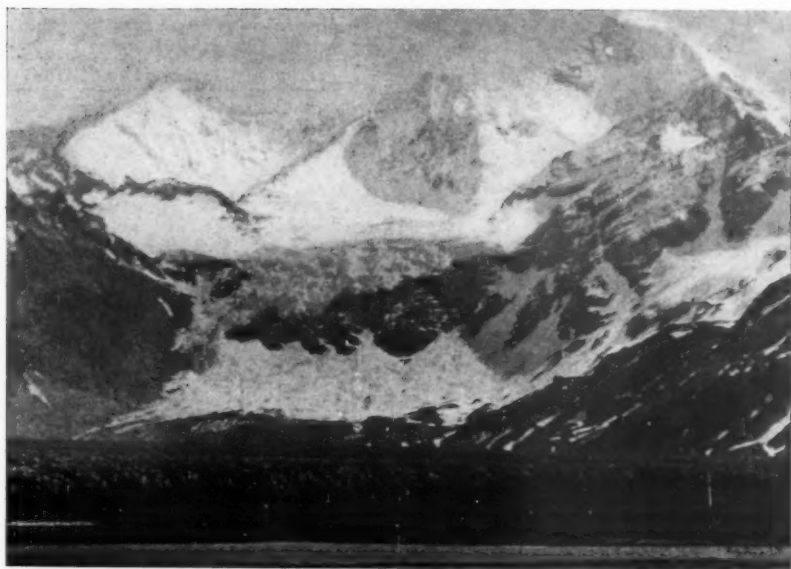
The question as to whether sea elephants are extremely polygamous is still unsettled. Certainly bulls of this type attack any other bull which comes into the vicinity. Cumberland Bay

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A DESOLATE ISLAND OF THE ANTARCTIC¹ SOUTH GEORGIA, IN THE LATITUDE OF CAPE HORN, THE GREATEST WHALING GROUNDS OF THE WORLD

By Robert Cushman Murphy

Curator, Division of Mammals and Birds, Brooklyn Museum

THE cold white hills of South Georgia were a most welcome sight after five months of sea life. That desolate isle, which for more than a hundred years has been the scene of ruthless sporadic destruction of fur seals and sea elephants, has of late become the base of the greatest whaling grounds in the world. The modern industry was instituted by a Norwegian of both north and south polar fame, Captain C. A. Larsen, who in 1893 touched at South Georgia with the "Jason" while on his expedition which led him into the Antarctic Sea east of Graham Land. Eight years later Larsen commanded Nordenskjöld's vessel, the "Antarctic," which likewise visited South Georgia, and upon returning thence he determined to establish a whaling station of the modern Norwegian type. Thus the *Compania Argentina de Pesca* was incorporated in Buenos Aires, and the right of locating in Cumberland Bay, South Georgia, was secured. Larsen's success led to the establishment of other plants, so that now in addition to the Argentine station there are five Norwegian and two English

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WHALE SKELETONS ALONG THE SHORES OF CUMBERLAND BAY

Twenty-five miles of seacoast covered with the debris of the whale factories — skulls, spinal columns, loose vertebrae, flipper bones, ribs and jaws piled in heaps and bulwarks to the farthest high water mark. The whale companies are now required by law to utilize waste material which is manufactured by guano plants into fertilizer to sell for several pounds sterling a ton

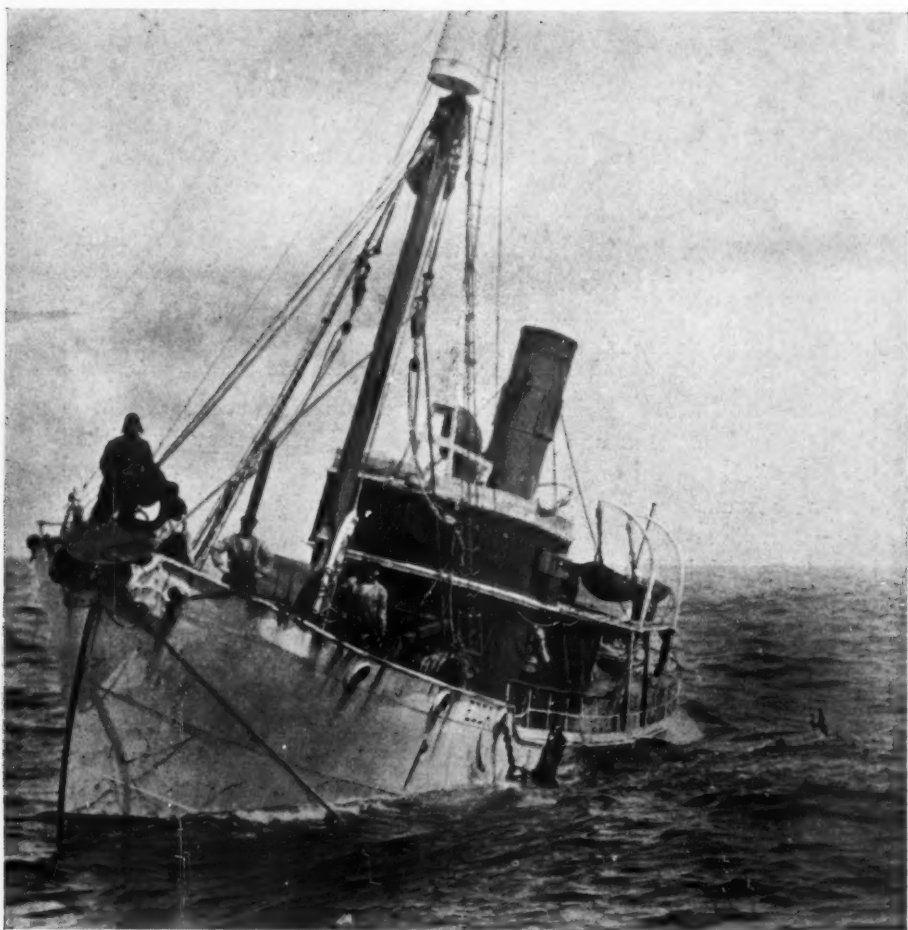
companies operating in various harbors along the northeastern seaboard of the island, and more than two thousand men are at work manufacturing oil and fertilizer and other products of the whale's carcass.

Phenomenal success has attended the whole industry; more than five thousand whales have been towed into the ports of the island in one year; twenty carcasses are sometimes received at a single station during twelve hours; and two and a half million gallons of oil have been tried out at one station during a season, to say nothing of whalebone and guano. Several of the companies have yielded a profit of more than one hundred per cent to the stockholders. And still the whales show slight signs of diminished numbers, although they are said to have become more difficult to capture than they formerly were. At present transportation is maintained between South Georgia and Buenos Aires; a British magistrate resides at Cumberland Bay, which has been declared a port of entry; and legislation designed to control the destruction of wild life has finally been enacted.

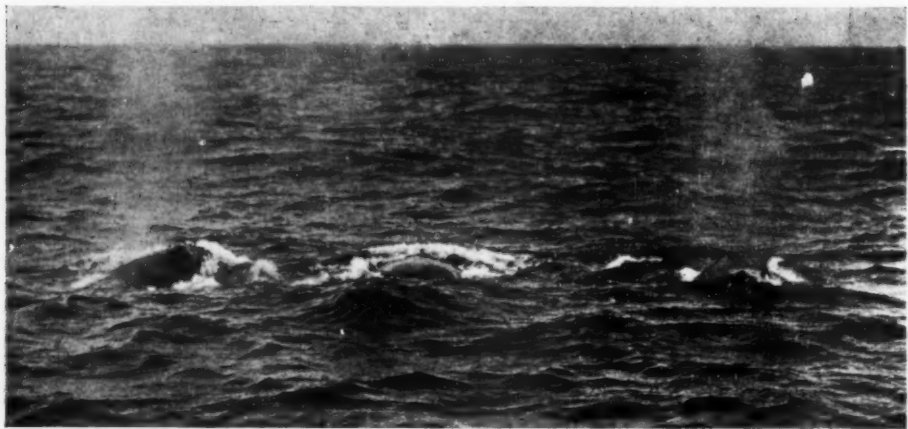
The whale taken in greatest numbers at South Georgia is the southern humpback or *knöll*, which is the mainstay of the industry. The slenderer and less profitable finback is also abundant, and is shot whenever the former species is scarce or shy. The giant blue whale or sulphur-bottom is third in importance, while sperm and right whales are taken more rarely, perhaps only once or twice a year. The height of the whaling comes during Christmas season, that is about midsummer.

The expedition to South Georgia Island, conducted jointly by the American Museum of Natural History and the Museum of the Brooklyn Institute of Arts and Sciences, returned last May after an absence from the United States of exactly one year. The itinerary of the New Bedford whaling brig "Daisy," which carried the museums' representative, was pleasantly roundabout, including in its course several West India islands, the Cape Verdes, the Brazilian island of Fernando de Noronha, and the uninhabited South Atlantic islet Trinidad, and affording opportunity for field work at each of these interesting tropical localities. The objective point of the voyage, South Georgia, lying in the latitude of Cape Horn, was not reached until November 23, 1912.

Although the long cruises in the tropical Atlantic, where not infrequently many days passed without sight of a bird, fish or other living creature more conspicuous than a Portuguese man-o'-war, were sometimes monotonous, such periods were well balanced by the occasional excitement of sperm-whaling or blackfish-hunting. The latter cetaceans were frequently encountered, and a good series of skulls of the tropical species was secured for the museums, the animals being captured with hand harpoons according to the venerable methods of the sperm-whale chase. Blackfish travel in large shoals, often in company with porpoises. I have seen both species, mixed more or less indiscriminatively, swimming along peaceably together in groups of three or four, the individuals of each group almost touching sides. When



A Norwegian whaling steamer of South Georgia just after the shot. A humpback whale is fast, and the harpoon line (on the port bow) is being drawn in by a steam winch located behind the mast. The chopped-off flukes of a dead whale show amidships. Note in the foreground a Wilson's petrel (*Oceanites oceanicus*) which migrates northward to our coast every year, and farther back a Cape pigeon (*Daption capense*) one of the commonest petrels of the southern seas



Three humpback whales (*Megaptera* sp.), two spouting. Photographed from a Norwegian whaling steamer, South Georgia



The whale-slip, Grytviken, Cumberland Bay

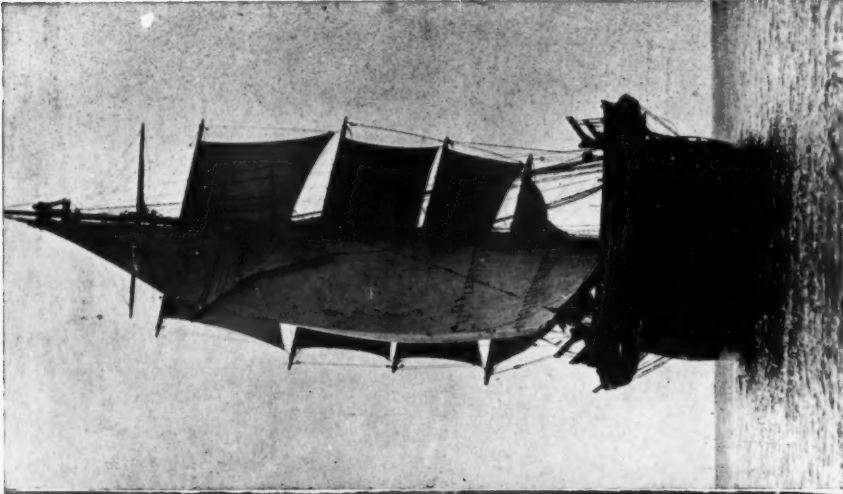


Snow-covered Mount Paget towering seven thousand feet above King Edward Cove, where is situated the meteorological station of the Argentine Government



BLACKFISH (*Globiocephalus* sp.?)

During the long cruises in the South Atlantic many days passed without sight of living creature, a monotony counterbalanced by the occasional excitement of blackfish-hunting according to the ancient method with hand harpoon



IN WHALING TRIM

The "Daisy" of New Bedford, the whaling brig which carried the expedition to the Antarctic and had previously been to Kerguelen Land and twice to South Georgia

blackfish are moving leisurely at the surface the back fin is exposed most of the time, but occasionally they lie idly, with the head, fin and flukes all under water and only the rounded angle of the high caudal ridge projecting above. When they rise to breathe the great square "junk" or snout, which yields the most valuable of all lubricating oils, is commonly thrust out of water as far as the eyes and the angle of the mouth. They are rather wary cetaceans, often avoiding the whaleboats with tantalizing skill, leading on the oarsmen only to render the pursuit hopeless in the end. Lying quietly at the surface they wait until the boat draws almost within striking distance and then "let go," as whale-men say, that is they sink straight down without appreciably altering the inclination of the body. From the masthead I have watched them thus lowering far down into the clear water until they became indistinct shadows. Within a few moments they reappear a short distance away, and sometimes, as if in mockery, raise their hinder ends out of water and beat the surface ten or a dozen times with the flat of the flukes, making a loud tattoo — a trait which recalls the "lob-tailing" of the right whale. If however the blackfish harpooner be so fortunate as to make a successful dart, the members of the herd gather about their wounded comrade and it then becomes comparatively easy for the other boats to select and strike their victims. Once fast, the struggle is but begun, for blackfish are strong fighters, sometimes tearing out even deeply buried irons. Usually they pull straight away for a short distance, and then resort to dodging tactics, jerking the boat violently from side to side or spinning it end after end. As the prize becomes exhausted and the boat is drawn close, there is a final flurry in which the captive lashes itself back and forth under the bow with terrific jerks, so that quick and skillful work is required in lancing.

In the South Atlantic, visible animal life was far more abundant than we had found it within the Tropics. Vast flocks of petrels of many species were our constant companions, and during rough weather numbers were caught on fishlines from the stern of the vessel, an exciting form of angling, especially if the game chanced to be an albatross or giant petrel with the baited bent nail at the end of a slender hand-line jammed in the hook of its bill, the bird being held only by its own resistance. The smaller petrels such as Cape pigeons, were caught on fishhooks and were hauled from the air as animated kites after they had pounced upon the trailing baits and had started to fly off with them.

The day after we had "made the land" at South Georgia the "Daisy" was towed by one of the whaling steamers into King Edward Cove, Cumberland Bay. This cove is the old "Pot Harbor" of American sealers, a term which has been preserved in a translated form as the name of Captain Larsen's whaling station — *Grytriken*. The tiny, land-locked haven nowadays greets the visitor through his sense of smell long before he rounds the point which shuts its entrance from view. The "whaly" odor increases

again as one enters the cove, which might be likened to a great caldron so filled with the macerated bones of whales that they not only bestrew its bottom, but also thickly incrust its rim to the farthest highwater mark. During the next few days I discovered that not King Edward Cove alone, but indeed the whole beach of the south fjord of Cumberland Bay, a shore line of more than twenty-five miles, is lined with an almost inconceivable number of bones, mostly of the humpback whale. Spinal columns, loose vertebrae, flipper bones, ribs and jaws are piled in heaps and bulwarks, and I could count seventy-five or one hundred huge skulls without moving from one spot. The region is one enormous sepulcher, yet no one can guess how many hundreds or thousands of flensed carcasses have been carried out to sea by the tide, and so have sunk their skeletons in the deep. Such reckless



The whaling brig "Daisy" at anchor in the Bay of Isles

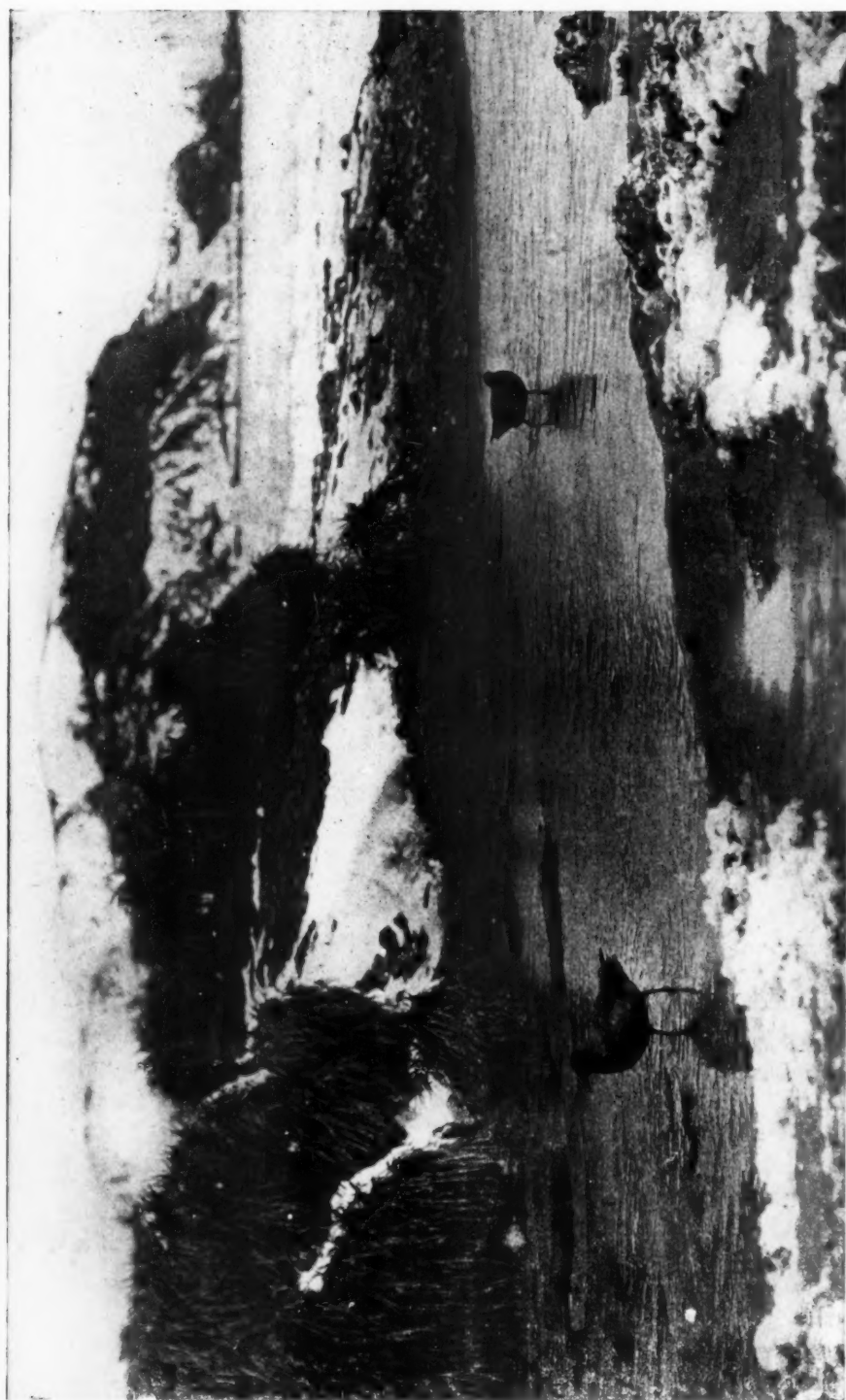
waste of a material which when manufactured into fertilizer is worth several pounds sterling a ton, was due to the exceeding abundance of whales in South Georgia waters and consequent neglect of all products of secondary importance to the blubber oil. But now the companies are required by law to utilize the entire carcass of the whale, and they have either installed bone-boiling and guano plants at their stations, or have sub-let this branch of the industries to "floating factories," that is vessels especially fitted for the purpose. One of this type, a 2000-ton full-rigged ship, was so occupied at the time of our visit.

During our sojourn in Cumberland Bay the time was occupied with trips into the surrounding mountainous country, particularly about the magnificent west fjord of the bay, a section reached overland from Grytviken through a high, extinct glacier bed, parts of which are smoothly paved with small fragments of shale packed edgewise by the ice in the manner of a

mosaic. This pass is, curiously enough, the route taken by sea birds, particularly terns and skuas, in flying from King Edward Cove to the west fjord lakes. It seemed odd to meet flocks of terns 1700 feet up in the mountains. The summit of the pass is marked by a stone cairn from which the way descends abruptly on the west fjord side to the lake basins in the ancient moraine. There are five transparent lakes, no two on precisely the same level, and the largest nearly half a mile long. Intermingled with them are low, irregular hillocks covered with tussock grass, and at the seashore the land rises again, ending in bold cliffs.

In this attractive area it is but natural that the majority of the twenty-three species of birds which breed on South Georgia can be found. The native gulls, terns, titlarks, ducks and the larger *Tubinares* nest upon the ground, trusting the safety of their eggs to protective coloration, concealment or constant guard, but the lesser petrels nest in deep burrows in order to escape the predatory skua gull, the universal enemy of every living creature it can master. Extraordinarily populous among the many inhabitants of the tussock hillocks I found the petrel *Procellaria æquinoctialis*, the "black night hawk" of our sailors and "shoemaker" of the Norwegians. At sea I had often caught these birds, which exceed our herring gull in size, on pork-baited fishhooks. In the west fjord section they were nesting in burrows which they had dug through the frozen ground to a depth of a yard or more, using both feet and bill in the process, and the chatter or "singing" of the subterranean tenants, a pleasant and rather musical sound, usually revealed their presence before the nest entrances under the spreading hummocks were noticed. Early in December nearly all nests contained the single white egg which was often soaking in a pool of muddy water thawed out by the sitting bird. When drawn out of their holes the shoemakers screamed in an ear-splitting key and bit and scratched savagely, but if set free they squatted on the ground stupidly for awhile before taking flight. During the day many flew in from sea with a shrill whistling of their stiff wing quills, and I often surprised others apparently sunning themselves in front of their burrows.

The greater part of our stay at South Georgia was spent at the lonesome Bay of Isles, and at Possession Bay where in 1775 Captain James Cook set up his colors and claimed the dreary land for his king. At the latter place our anchorage was all but inclosed by a curving wall of valley glaciers the grandeur and proportions of which made them quite outclass the moribund glaciers of the Alps. The difficulty of working at these harbors was very great indeed because an ordinary camp outfit proved inadequate for the conditions encountered. South Georgia is a region of almost continuous violent gales, and my light tent was worthless. It was impossible to keep an oil stove burning within it, so that I suffered considerably from the cold while preparing bird specimens, and moreover the tent blew down frequently



SKUA GULLS FORAGING. BAY OF ISLES

The skua or sea hen (*Megalestris antarctica*) is the most aggressive bird of the far south, subsisting almost entirely upon other birds although it also eats carrion. In habits and plumage it resembles a buzzard hawk more than a gull



A blue-eyed shag (*Phalacrocorax atriceps georgianus*) brooding her young. In this beautiful species the ring of bare skin about the eye is cyanine blue. The feathers of the crest, back and wings are richly iridescent. The birds are of more gentle disposition than our northern cormorants and will allow themselves to be stroked while on the nest. Bay of Isles



The petrel called "black night hawk" by sailors and "shoemaker" by Norwegians at entrance of nest burrow. The burrows are dug through frozen ground to the depth of three feet or more. The chatter or singing of these subterranean tenants is a pleasing sound



King penguin (*Aptenodytes patagonica*) incubating its single egg. Bay of Isles. A king penguin carries its egg on the instep covered by a fold of the skin on the belly. The sexes relieve each other in the duties of incubation



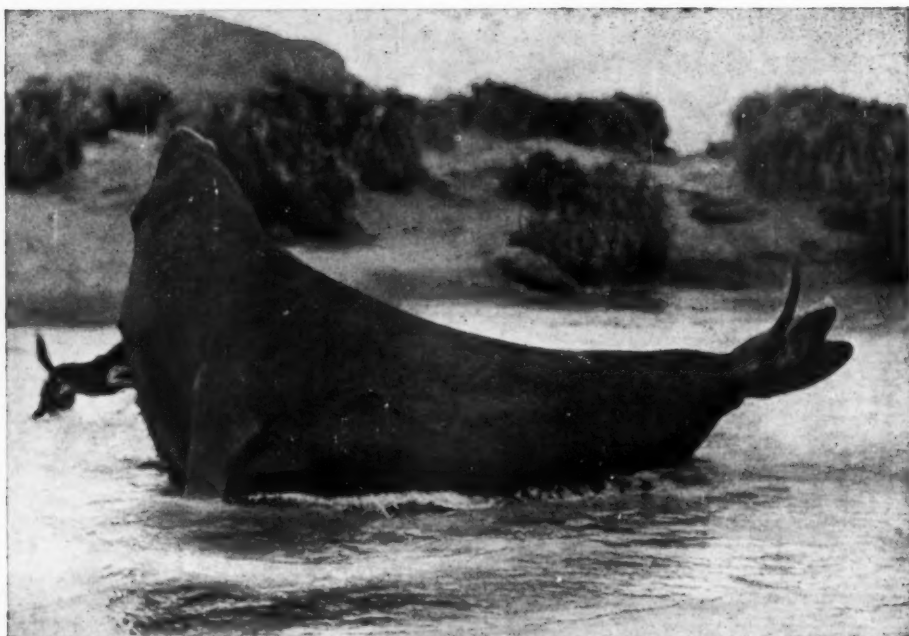
A Johnny penguin (*Pygoscelis papua*) walking up to be chummy. The "Johnnies" are the commonest penguins at South Georgia; their eggs make an important food supply for the Norwegian whale-men. Temperamentally they are inquisitive, social with their kind, and quick to start a fight with one another

exposing everything to the snow and sleet. Eventually it blew to shreds. Very often blizzards made it impossible for a boat to leave the ship; and sometimes we were stormbound for three successive days.

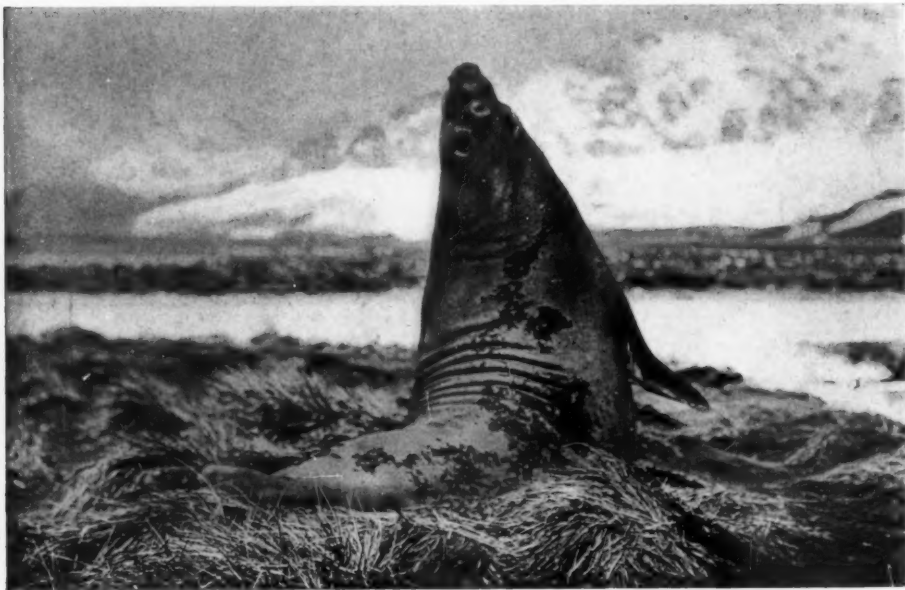
Since the long-gone days of the fur seal harvest at South Georgia, when a hundred thousand "golden fleeces" a season were sometimes taken by "Argonauts" chiefly from Long Island and New England ports, the isle has been best known as a home of the sea elephant. The Antarctic species of this largest of seals differs markedly from the Californian race, and formerly had a circumpolar distribution. The great brutes being abundant as well as comparatively inoffensive and easily killed, a relentless pursuit of them was conducted wherever they could be taken on shore, or from Juan Fernandez southward and eastward to the Falklands, and throughout the isles of the South Atlantic and Indian oceans to the outliers of New Zealand. In many of its ancestral haunts the sea elephant has long since been wiped out of existence, but on South Georgia it had until recently a stronghold second only to Kerguelen Land. It is true that the heavy toll of "elephant oil" exacted of South Georgia in the nineteenth century brought the animals at several periods near the verge of extinction; there is a record that in 1885 the crew of a Connecticut schooner, which made a voyage thither in search of both oil and furs, were able to find only two sea elephants during a stay of ten weeks. But this example is perhaps without a parallel, and in any case sea elephants had been fairly abundant of late years in all suitable harbors and fjords of the island until three or four seasons ago. Since then the existence of the much persecuted animals has been threatened probably



Sea elephant rearing. In attacking, the bull sea elephants raise themselves until the fore flippers are clear of the ground and then hurl themselves forward



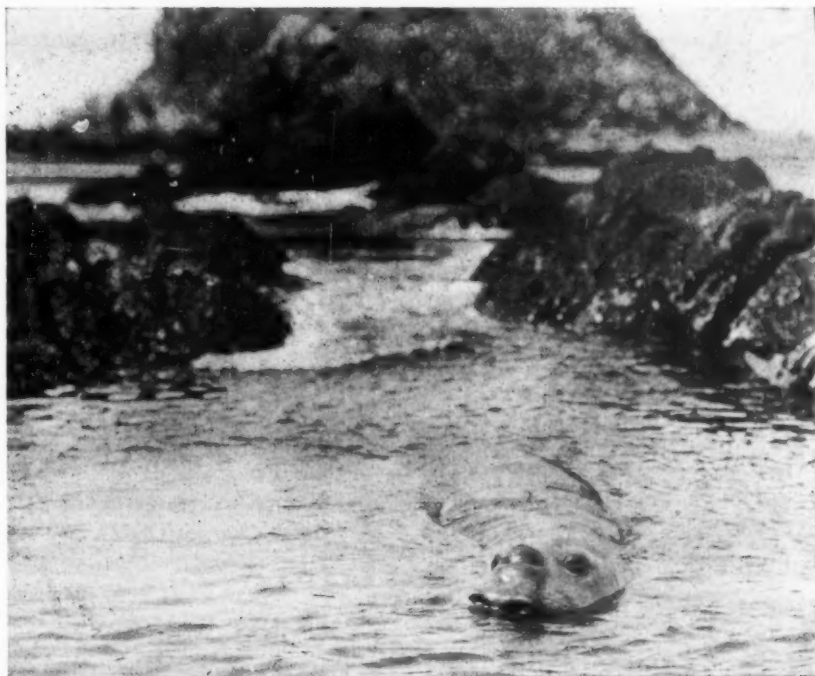
Sea elephant (*Macrorhinus leoninus*) worried by the ship's fox terrier. The great brutes when fighting can swing about very quickly by flinging their hinder ends into the air



A Parthian glance as he retreats. A sea elephant can progress for a short distance at the speed of a brisk walk. Note that the inflatable sac on the snout of this bull is collapsed because the nostrils are open

more seriously than ever before by the business-like and thorough ravages of one of the whaling companies which takes seal oil as a side line of whaling.

Soon after our arrival at South Georgia we began to fall in with sea elephants. As nearly as I can determine from my subsequent observations, filled out from the accounts of experienced sealers, the life history of these animals is very briefly as follows: The single "pups" are born on shore in early spring (September, October), and the old ones pair immediately afterwards while the young are nursing. For a period the adults then lie ashore, moving little and of course feeding not at all, while they grow gradu-



Sea elephant swimming at the surface. Bay of Isles. Usually sea elephants swim beneath the surface, gliding through the seaweed with great ease

ally thinner, supporting life upon their own plenteous blubber. The pups are more active, frequently entering the water and playing with one another in schools. They seem to be weaned at an early age, probably during November. After six or eight weeks the mature animals go into the sea where they feed, and may journey hundreds of miles, but on this part of their lives there is a gap in our information. A few slothful individuals continue ashore, and I have seen bulls of this sort in a state of pitiful emaciation, lying in wallows either alone or with four or five cows, as late as March first. Early in January well nourished adult sea elephants begin to "haul



A bull sea elephant. Bay of Isles

up" from the sea again, and as the month advances considerable herds of exceedingly fat females gather on the upper beaches. The males come later, during February and March, and are then of enormous bulk and very lethargic. These are the "March bulls" which sealers prize, for one such may yield five or six barrels of oil. They locate wherever they can find company, and if undisturbed remain in sleepy ease throughout the remainder of the Antarctic summer and the autumn. During the winter they divide their time between the land and the adjacent waters, and are in prime condition when they come ashore to stay during the breeding season of the following spring.

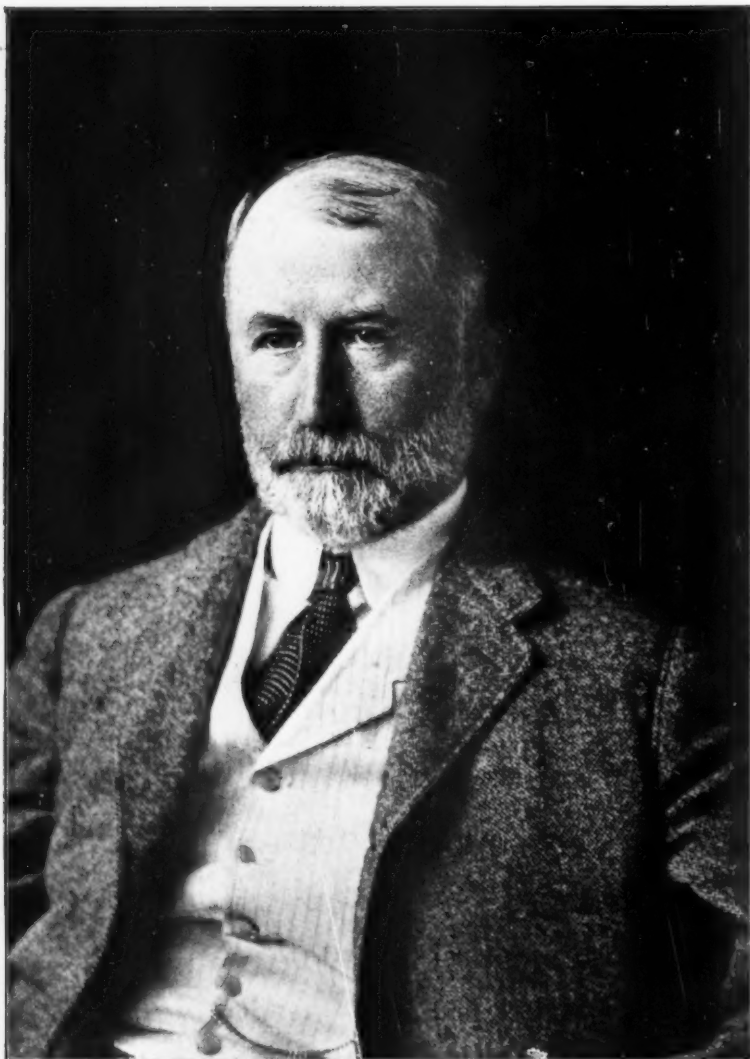
The attribute *par excellence* on which the sea elephant's reputation rests is large size. For a number of weeks after arriving at the Bay of Isles I saw no animal more than thirteen feet in length, except the dismal remains of bulls slain in former years. But during February, seventeen and eighteen-foot bulls, just out of the sea, were taken a dozen times, and on the last day of the month the record seal, twenty feet six inches long, was killed in Possession Bay. I did not see this huge brute until after it had been stripped of blubber, but as it measured twenty-one feet four inches (651 centimeters) while lying on its back in its flensed condition, the mate's flesh measurement is certainly not exaggerated. Our second largest bull was shorter than this by two feet. When the animals are in best condition (from a sealer's point of view at any rate) a large sea elephant's girth may very nearly equal its

extreme length. The fattest I saw was a bull eighteen feet four inches long, and so round and distended that it had the appearance of being pneumatic, and inflated under high pressure. Seven men could barely turn its body over with the aid of ropes and hand holes in its skin, even after half the blubber had been removed and a trench had been scooped under one side of the carcass. The blubber was a trifle less than eight inches thick in the center of the breast, and the brute yielded almost as much oil as a young sperm whale. I gained a good idea of the weight of a sea elephant by cleaning up the skulls, for there was no man among the crew of the "Daisy" who could pick up and carry the head of a large bull until the hide and fat had been cut away from it.

The question as to whether the greatest of the seal kind is to be preserved at South Georgia depends largely upon the results of an investigation of the status of whales, seals and penguins, now being conducted for the British Colonial Office. The difficulties and expenses of the fishery make it almost impossible for any species of whale to become completely extirpated, however persistently it may be chased, but the unfortunate sea elephants have no such hope of preservation. Slow, unsuspecting, gregarious, they can be hunted profitably until the last one has gone to his ancestors and the calamity of the Antarctic fur seal is repeated.



A spectacled albatross (*Diomedea melanophrys*) or "mollymoke." South Atlantic. These birds are less numerous at South Georgia than the great wandering albatross



By courtesy of Greaves Publishing Company

THE LATE WILLIAM J. GAYNOR

William J. Gaynor, Mayor of the City of New York since 1909 and as such a member of the Board of Trustees of the American Museum of Natural History in its capacity as an educational institution of the city. Mayor Gaynor died suddenly on the "Baltic" on his way to England, September 10, 1913

"And I have got to that point where nothing said about me affects me much. Nothing that could happen to me would affect me much. I think I would be satisfied under most any circumstances. I think we all ought to feel that way — especially if you are going into political life, young men. Whatever God's will may be of me, I am content." *From address to Politics Club of Columbia University.*

"Consider that the great universe of which thou art only a trivial speck, is governed by fixed laws, and be therefore content in all things, and especially to die at any time, and abide God's will of thee, whether of individual future life, or dissolution into universal mind and matter." *From letter to Dr. Finley after reading Marcus Aurelius.*

WILLIAM J. GAYNOR

MAYOR OF NEW YORK CITY, 1909-1913

AS is known not only to his own city but also to all great cities of the civilized world, William J. Gaynor, Mayor of New York, died suddenly at sea September 10. This man who because of his work as supreme judge and as mayor of New York City, will stand in the future history of the politics of America as one of its most forceful figures, honored the American Museum as a member of its Board of Trustees for the three and a half years of his mayoralty. To be sure Mayor Gaynor's engrossing political work through his interest in both city and national problems allowed him little time for consideration of educational questions — which is unfortunate, for it is certain that he would have brought to them the same quick grasp that he had for the core of a problem in law or politics, the same clear vision of means to end, and strong terse words and abundant courage for expression.

Mayor Gaynor however did not need to take active part in education to have influence there. He had a large influence because of his personal example. He was always a student. He continued reading the old and the new in law, history, philosophy — and his farm is practical proof of his interest in agriculture. This influence moreover will continue through his speeches and letters, a small number of which have just come in book form from the press of the Greaves Publishing Company.¹ What he has said in these letters will be remembered when what another man may have said is forgotten, for he did not choose words to please but to express fearlessly and effectively what he thought. It is a pleasure to quote the following from an address to the Politics Club of Columbia University, March 13, 1913:

.....See whether you are going into politics really from high motives or not. Are you going into politics to help the community or to help yourself? It is very easy to deceive ourselves. But my advice to you is to go into politics only after a firm resolve that your whole and only motive is to help the community in which your lot is cast. . . . Do not give up your studies. Keep reading when you go out of here. If you are studying mathematics, continue the study of it. It is one of the greatest drills for the mind. I don't mind saying that I like now to take a problem of Euclid and pore over it and do it again, and think I am as smart at it as I was when I was your age, which of course I am not. And the same with your reading. Pick up especially works of the philosophy of history. There was once a great professor here in New York who wrote "The Intellectual Development of Europe," . . . But read books like that. Read Lecky. Read Hallam. Read the book of Emil Reich, "Success among Nations." Read Green's "History of the English People." . . . And then, of course, other books, like the Bible and Shakespeare, and works of autobiography, like Franklin and Benvenuto Cellini. . . . You are not doing much more here than learning how to learn. Unless you acquire the studious habit here you might as well go home to-morrow. And do not be under the delusion that you can get to anything great in this world without preparation. . . . Do not rely upon your genius. I know you are all geniuses. But nevertheless do not rely on it. It has been said by a man who has sense that genius is two per cent inspiration and 98 per cent perspiration. . . . Get ready and you are a genius. But if you think you can do it without getting ready you are more fool than genius, I can tell you that. And you cannot do that without keeping up your thoughtfulness and your study. . . . The saying is that no lawyer ever came to fame with a straight back or without a pale face. That tells the whole story. To be great in anything, you have to toll terribly, in the language of Sydney Smith. There is no other way to do it. You have got to pay the price; and if you are not willing to pay the price you cannot do it.

¹ MAYOR GAYNOR'S LETTERS AND SPEECHES. New York: Greaves Publishing Company, 1913.



Courtesy of American Press Association

CROCKER LAND EXPEDITION—CHAIRMEN OF COMMITTEES AND STAFF

Upper Row, left to right—HENRY FAIRFIELD OSBORN, EDMUND OTIS HOVEY, DONALD B. MACMILLAN
Lower Row, left to right—HARRISON J. HUNT, MAURICE C. TANQUARY, W. ELMER ECKBLAW, FITZHUGH GREEN, JEROME LEE ALLEN

CROCKER LAND EXPEDITION

REPORT BY DONALD B. MACMILLAN, LEADER

THE sealer "Diana," carrying the Crocker Land expedition with Donald B. MacMillan, leader, sailed from New York July 2. The first port of call was Boston, where she took on additional supplies, among which were seven tons of pemmican. The second port of call was Sidney, Nova Scotia, where the supplies were increased by twenty tons of dog biscuit and several hundred tons of coal.

When the "Diana" sailed out into the Strait of Belle Isle July 12, she encountered much ice and finally dense fog. The difficulties of navigation became very great and on the morning of July 17 the ship was wrecked on the rocks off Barge Point, Labrador. This did not prove a great disaster for the expedition however. The whole party and all the supplies were transferred to the steam sealer "Erik" of St. John's and on July 31 the start was again made for the north with only a brief stop at Battle Harbor, necessary to take on board the thirty-foot power boat, the "George Borup," before the ship cruised direct for Cape York.

On August 5 many icebergs of great size came in view and at night all was obscured by fog. The days passed with slow progress between giant icebergs and through impenetrable fog until August 14 when the fog lifted and to starboard lay the coast of Greenland, and the expedition had its first view of the midnight sun. On the next morning the "Erik" touched shore at the southernmost village of the Innuits, then steered on along the coast past North Star Bay where the Danes have established a mission and erected a shelter for meteorological instruments, past the village of Oomenoee where three Eskimo were engaged, on past Inglefield Gulf and Igludahoming. This village where three more dog-drivers were engaged, is made up of but six tupiks on a meadow sheltered by storm cliffs and covered with the golden poppies and dandelions of the Arctic. The following which carries the story to August 30 is quoted from the report cabled to New York by Mr. MacMillan:

"We left Igludahoming August 18, for Nerky. Everywhere we found the Eskimo thriving, prosperous and healthy. They had already laid in ample supplies for winter, despite the fact that most game is scarce this year, particularly the walrus and eiderduck. Narwhal and seal are relatively abundant.

"From Nerky the 'Erik' steamed on to Etah, our last stopping place before crossing to Ellesmere Land. Here we stayed until Thursday afternoon, detained by great fields of ice in Smith Sound. Etah is a place famous in Arctic explorations, and in its sheltered harbor many ships have found safe anchorage. We took on more Eskimo here. We have now on

board eight good dog-drivers, with their wives and families, a total of twenty-six Eskimo and eighty dogs and twenty-five pups. These dog-drivers are among the best in the tribe. They improvised little igloos on deck for their families from our boxes of supplies in the main hold. They must have inherited some of the skill of our prehistoric cave-dwelling ancestors. They put their kayaks up on the stays, from which they could easily put them overboard when they wished to go after a narwhal or a walrus.

"With Etah as our base, we bucked the ice in Smith Sound for over a week, embracing every opportunity that promised a way across to Cape Sabine and retreating to the harbor whenever the closing ice threatened to crush our ship, there to stay until our watch on the mountain back of Etah should report a favorable lead widening toward Ellesmere Land. Every lead that promised ingress to Flagler Fjord, where we had planned to establish our headquarters, was eagerly followed through our glasses.

"From the barrel at the masthead the members of our party took turns at the watch, but in vain. We were even unable to approach within fifteen miles of Cape Sabine or of Payer Harbor on Pim Island, where we might have established a base from which it would have been relatively easy to prosecute our explorations and scientific research, though with less dispatch and certainty of accomplishing all we hoped to do. On our latest attempt we encountered a massive pack that extended without break from Lyttleton Island to Cape Sabine, studded with colossal floes and massive bergs. This impenetrable barrier extended as far back into Kane Basin as the vision could attain with the most powerful glasses. An unfavorable wind was packing all the drift ice against the barrier. The most optimistic among us could not detect a ray of hope that a passage would open this year, and we reluctantly abandoned our attempt to cross to Ellesmere Land and turned the ship back to Etah.

"Thus Etah becomes the headquarters for the Crocker Land expedition. On the site of Peary's old base we have unloaded our supplies and equipment and begun the foundation of the house which is to be our home for the next two or three years. The 'Erik' was laid up along the rocks, and everything except our lumber unloaded directly, without the aid of boats, about a quarter of a mile from the site of our house.

"The site we have chosen offers the maximum comfort and convenience attainable in the North. Its only drawbacks are a restricted view of the sea, a rocky shore to land our boats and a doubtful position for our wireless aërials. Its advantages are a sheltering protection from the cold winds of the north and east, accessibility to water hunting-grounds and the sea, proximity of Eskimo to assist us in our work, full exposure to the sun whenever it shines, favorable conditions for valuable scientific work and an accessible gateway to the Greenland ice cap, which we hope to explore before next summer. Altogether Etah is perhaps the best possible site on the Green-

land coast for our purposes, though not at all comparable with Koldewy Point, on the Bache Peninsula of Ellesmere Land where we had hoped to be.

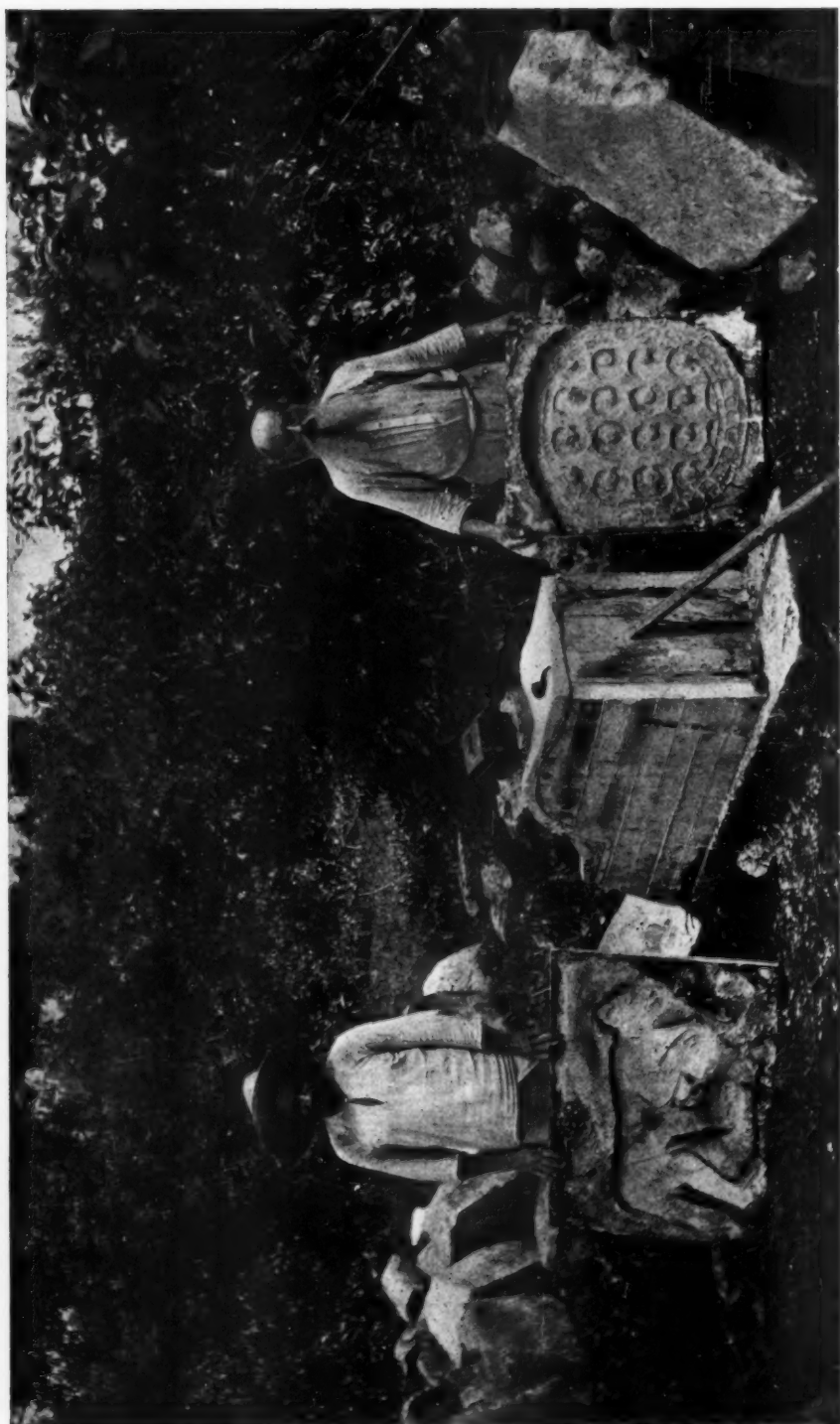
"Reluctant as we are to give up our plans to winter on Ellesmere Land, the near approach of winter and the long night, the vast amount of work before us, the uncertainty that Smith Sound will be open this year and the dread that the 'Erik' should be frozen in, with the consequent necessity of feeding the entire ship's crew for ten months from the provisions intended only for our party, all forced us to the decision to go into winter quarters on the Greenland coast without further delay.

"Our entire party is in good health, optimistic and determined to make the most of our bad fortune in not attaining Ellesmere Land this year. All are eagerly at work building our house, storing our supplies and arranging for the winter's work. Every one realizes that there is much to do and a limited time in which to do it.

"Snow has already fallen twice since we came to Etah and ice freezes on the harbor nearly every night. The birds are migrating southward and the Eskimo making their final preparations for relinquishing their life in the tupiks for the warmer interior of the igloos. The chill and sternness of the great North have already settled down upon the plateaus, for upon them the streams are even now frozen dry with the temperature falling to 22 degrees Fahrenheit. There can be little doubt that the Greenland autumn is far advanced and that winter is not far distant.

"The 'Erik' will leave us as soon as she has taken on ballast and water and been made ready for the voyage south. With her will go Judge Carroll Sprigg and Fredrick B. Patterson, of Dayton, Ohio, who accompanied us as tourists and who we wish might stay with us. They have endured the misfortunes, inconveniences and unpleasantnesses of the voyage as good sportsmen and we are loath to lose them. After we bid them goodbye, and they and the 'Erik' are gone, we shall again turn our faces to the work and problems before us, alone except for the gentle, patient, little brown people, the Innuits who will help us. We greet you all who have helped us, all who are interested in our welfare and think of us, and then the North claims us."

Judge Sprigg and Mr. Patterson returned to civilization giving an enthusiastic report of their trip to Etah with the expedition. They repeat the story cabled by Mr. MacMillan, that the fight against the ice was hopeless and return to Etah necessary. This practically reverses the plan for the three years' work, putting the exploration of the Greenland ice cap for next summer instead of the summer of 1915 as scheduled, and deferring the search for Crocker Land until this later time.



PIETRO GRISANTI, EXPERT MOLD-MAKER

The photograph shows a mold of the shield and the jaguar which constitute the design in the frieze of the Temple of the Jaguars. [Compare with photographs on pages 272 and 280]

THE TEMPLE OF THE JAGUARS

REPORT OF WORK PRELIMINARY TO THE REPRODUCTION OF
THE FRONT FAÇADE¹

By Edward H. Thompson

ONE of the most important archæological problems of the day is that of the ruined cities, vestiges of an ancient American civilization, that lie strewn over the surface of the Yucatan peninsula. Who were their builders and where did these builders come from are among the queries of to-day as they were in the days of Stephens, Von Humboldt and Brasseur de Bourbourg.

Whether the ancestors of these ancient builders with their undecipherable glyphs, their ornaments and tools of jade, came from Asia by the way of Behring Strait, were broken branches of a lost Atlantic stem, or grew up by gradual evolution from purely indigenous roots we may not yet know, but we do know that in times ancient even as science now interprets the word, civilized races were born in the Americas, that these races lived out their days and then sank back into the dust from whence they came, leaving faint traces of their having been, to mock our ignorance. No one wise in the knowledge of these things even thinks to name, much less to fix by time, the origin of these most ancient, long-forgotten and temple-building races of America.

The last of these earlier races was the one from whose fast-dying fires the Aztecs and allied people kindled the fierce flames of their civilization. This earlier race, call it Toltec if you will, was probably the one that built the now ruined cities of Yucatan of which Chichen Itzá was the great mother city.

Chichen Itzá was the largest and most important ancient city on the peninsula of Yucatan, if not indeed over the whole area, influenced by that distinctively American civilization that students now call the Maya. Its great pyramid temple with its four broad stairways and nine parallel terraces rises from the midst of a man-made plain and looms against the sky in massive grandeur. Seven other structures still rear their sculptured walls, defying time, and hundreds more lie prostrate, their carved stone walls and what were once their chambers now but shapeless heaps of stone, lime and fallen columns.

¹ Mr. Thompson was engaged by the Museum to make molds for a full-sized model of the ruined Temple of the Jaguars in Yucatan to be erected as an architectural feature of the Columbus Avenue entrance to the Museum when that extension of the building is erected. He owns the site upon which the temple stands and has long been a student of the ancient architecture of the Maya race. In addition to the molds Mr. Thompson has prepared drawings and selected photographs all of which will make it easy to reproduce this aboriginal masterpiece.



TEMPLE OF THE JAGUARS

This temple is some five hundred feet to the west of the pyramid temple. The entire front has fallen outward over the twin serpent columns [See cut page 266] which acted as levers, to be hurled over the edge of the temple platform into the Ceremonial Court thirty feet below. It is this fallen façade — a huge mass of masonry, broken stone and lime compacted to a cement-like hardness by years of exposure and covered with centuries' growth of trees — that the American Museum hopes to reproduce in its original beauty. All accumulated débris was cleared from the temple platform and surfaces unfamiliar to modern students were laid bare. The steps of the wide stairway have the narrow treads (8 in.) and high risers (12 in.) characteristic of sandal-wearing people. A large stone plate with paneled carving rests at each side of the stairway directly below the point formerly occupied by a carved stone serpent head. These heads were found during the excavation [See page 271]



PYRAMID TEMPLE OF CHICHEN ITZÁ

Pyramid temple with four broad stairways and nine terraces. Chichen Itzá was the mother city in that prehistoric civilization that students for convenience sake now agree to call "Maya." No one tries to name or set the time exactly of these building races of Yucatan. Of this city seven other structures, among them the Temple of the Jaguars, still rear their walls while hundreds lie as shapeless heaps of masonry

Five hundred feet to the west of this pyramid-temple but on the same great terrace, rest two huge moles of masonry, stone-faced, each 274 feet long by 30 feet high and 30 feet thick. No lines of cornice or bands of ornamentation interrupt the sheer vertical walls, but high up the inner wall surface, two large stone rings once projected, one on each side and each opposite the other. One of these has been broken from its place and lies on the ground beneath, but the other still remains firm and projects boldly from the sheer surface. Between these two moles is a level space 121 feet wide, called the Ceremonial Court. These stone rings and the Ceremonial Court were probably used in the performance of sacred rites and in games of a religious character.

Upon the southern end of the eastern mole rests an edifice that is in many respects the most interesting of all the structures still standing. It is called the Temple of the Jaguars, from the remarkable frieze or band of well-carved jaguars that alternating with shields, once extended around the temple walls.

Below the temple proper which is two-chambered, the remains of what was once a third chamber is still visible, facing the east and resting directly upon the level surface of the great ground terrace. A large portion of its walls has fallen but upon the portions of wall surface still standing can be seen carvings in low relief of intense interest.

The inner chamber of the

structure above, that of the temple proper, has its walls as yet almost intact and they were once completely covered with mural paintings depicting domestic scenes, early migrations and war forays. Nature however has passed her erasing hands over large portions of the smooth wall surfaces and vandal man has proved more pitiless than Nature in defacing the works of the ancient artists, yet even so, enough remains to make this chamber the repository of what is probably the finest examples of this class of mural paintings yet left to us for study and comparison. The walls of the outer chamber were once covered with paintings but of these not a single legible outline remains. The great twin columns fashioned into the conventionalized forms of serpents still hold in the deeper carvings and cavities, like those of the mouth and the bulbous teeth, traces of the pigments that once covered the surfaces of columns and chamber walls.

The entire front of this beautiful structure, as chaste and artistic in its own way as the temples of Greece and Rome, has fallen. Fractured and wrenched apart by the growing tree roots at the apex of the roof, the weakest point in all the structure, the overweight of the heavily ornamented façade caused the whole mass to fall outward, and turning upon the two serpent columns as upon gigantic pivots, to be tossed nearly clear of the temple platform, crashing down to the hard and level space of the Ceremonial Court full thirty feet beneath.

This façade with its beautiful frieze of carved stone figures, graceful meanders and noble proportions, it is hoped to reproduce in as nearly as possible its pristine state. It is an undertaking much in line with the desires of the late John La Farge, who with me had long felt the wisdom and necessity of incorporating in some definite way the ideals and fruits of these ancient distinctively American architects into what is fast becoming our own modern distinctively American architecture.

For these reasons I not only felt greatly honored by the action of the high authorities of the Museum in confiding to me this important undertaking, but I also felt that I had a double charge and a double incentive, inasmuch as in so doing I was aiding in the fulfillment of the dead artist's dream and in my own hopes as well. Such measure of success as I may have attained must be attributed more to these incentives than to my own merely personal abilities.

Proceeding to Yucatan I attacked the task with enthusiasm. My previous experience in reproducing the "Labna Façade" and in the still more important undertaking at the World's Fair in Chicago aided me greatly in working out the problems and overcoming the obstacles in this task.¹ Then too the efficient aid of my oldtime companion in the field, Pietro Grisante, the expert plaster-mold maker, was to be at my service and I knew how much I could rely upon him.

¹ Official Report Mass. Board of Managers, World's Fair, page 161.



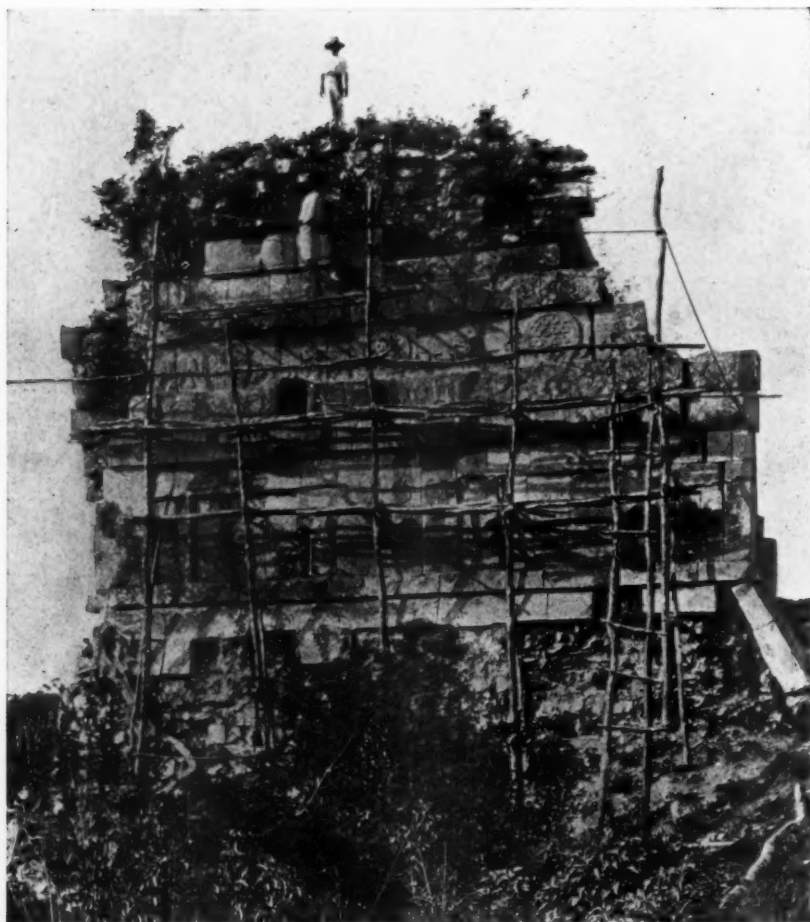
Five hundred feet west of the pyramid temple are two moles of masonry, 274 feet long, 30 feet high, 30 feet thick. The space between (121 feet wide) was probably a ceremonial court used for celebration of sacred rites and games. Upon the southern end of the eastern mole rests an edifice called the "Temple of the Jaguars"



A beautifully carved serpent head that we came upon in the excavating



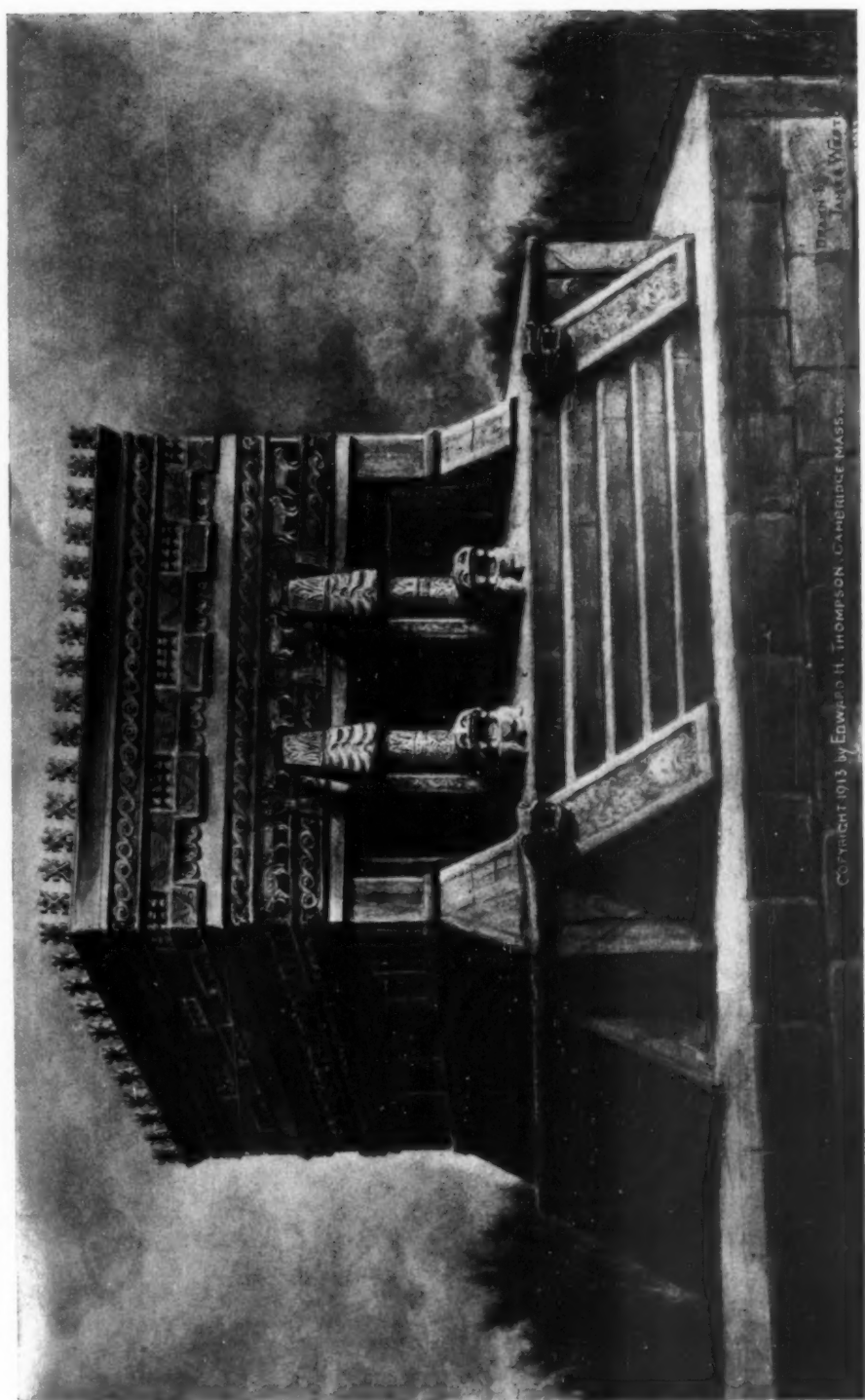
Façade portions uncovered. Every cubic foot in the fallen mass was gone over and not a fragment however small was thrown aside without careful examination



The paper molds of the carvings still in place had to be made from a scaffolding of large and small poles bound together with ropes, native fashion. Some danger attended the work because of the disintegrating condition of the walls and the continual movement and shaking of the scaffolding which swung fully fifty feet above the temple terrace. Once we had the work done and the paper molds ready to be dried by the hot sun when a storm arose and the wind whipped our tarpaulins aloft like so many handkerchiefs and scattered the molds in bits far and wide

The greater portion of this once beautiful façade lay in a huge mass of masonry, broken stone and lime, over thirty feet below the front platform of the temple. The commingled mass had become compacted by rain percolation and time pressure into a cement-like hardness. Over this had accumulated a thick blanket of vegetable mold and trees had grown as huge as those of a forest primeval. Their rotting trunks were still visible and their myriad roots yet bound the stone masses as if with bands of iron.

The work commenced by the clearing off of all the superficial accumulation and débris upon the front chamber floor and the platform of the temple. In so doing we came upon mementoes of earlier workers in the field. A long



DIAGRAMMATIC DRAWING OF THE TEMPLE OF THE JAGUARS

It is planned to use a restoration of the Temple of the Jaguars as an architectural feature of the Columbus Avenue entrance of the American Museum 273

narrow break in the floor evidenced the trench that the tireless student Dr. August Le Plongeon dug when he interred the fourteen Atlantean figures to keep them safe from vandal hands. An empty marmalade can was the souvenir left by Mr. A. P. Maudslay, now president of the Royal Anthropological Institute of Great Britain, and I was almost ready to affirm that it was the same can that I helped him to empty nearly a quarter of a century before. A daintily marked crystal flask that once held citrate of iron, could only have been the property of Miss Adèle Breton, the gifted artist-student whose copy of the mural paintings within the inner chamber of this temple are as beautiful as they are exact. Other finds were of other later visitors but more prosaic and so less interesting.

With the cleaning off of all this modern and near modern accumulation, the steel probe, the whisk broom and the trowel laid bare surfaces and outlines untouched by modern students. These were followed up until the full original outlines of the entire front platform were clearly defined and worked out.

Carefully disposing of the accumulation removed, that it might not fall upon and so disturb the true sequence of the material below in which excavation was to be made later, the carved stone work to the right and left of the wide front stairway and the entirely new carvings brought to light by this clearing were all carefully cleaned, photographed and measured as preliminary processes to that of making the molds of plaster or of paper. It was found that the wide stairway in front of the temple platform consists of four steps (excluding the base and platform planes) each twenty-seven feet long with an eight inch tread and a twelve inch riser. These narrow treads and high risers are characteristic of a sandal-wearing people.

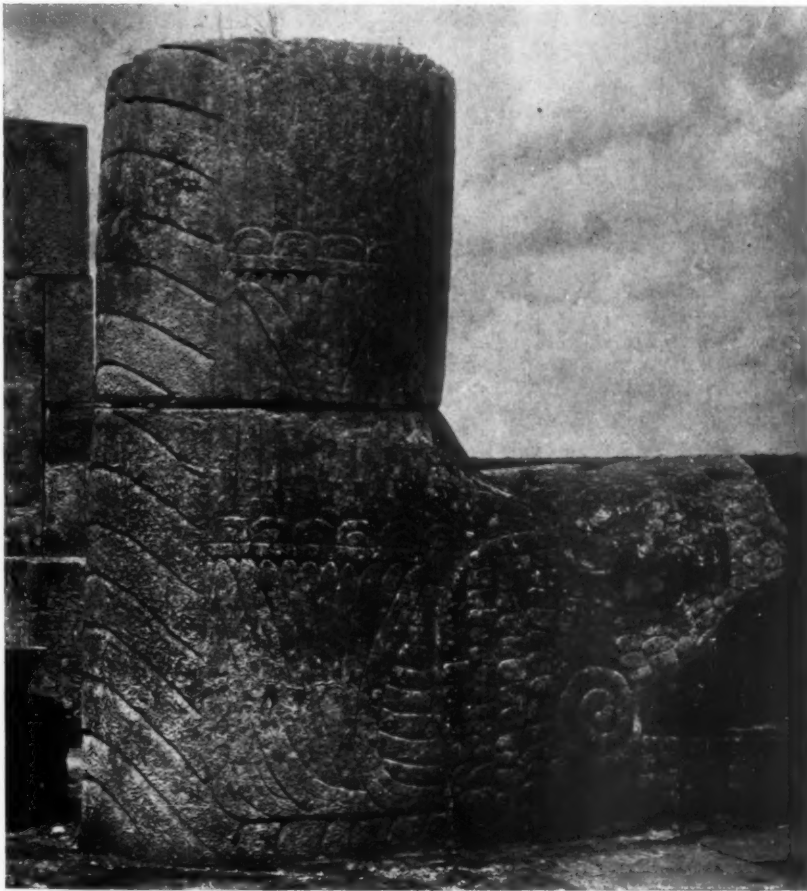
To the right and left of this stairway and binding it in place are large stone plates, one on each side, and each plate has upon its face a paneled carving. Beyond each of these stone plates which are inclined at the same angle as the stairway, are recessed walls slightly inclining from the vertical inward toward the temple. The wall on the left looking from the temple entrance is still in place although portions of the handsome stone slabs are missing but of those on the right, only the terminal post is visible and that is lying mutilated and prostrate. Probably the fall of the façade mass pushed the stones from their places and broke them into unrecognizable fragments on the hard surface far beneath.

It was during the excavations of this mass of accumulations upon the front platform of the temple that we came upon evidence of the fact that the two beautifully carved stone serpent heads found later in the fallen masses below, when in their places rested one on each side of the stairway and directly over the paneled and carved stone plates.

The symbol of the feathered serpent seems to have been to the New World races what the cross was to the Old World. The origin of both as religious symbols is buried in mists of antiquity so dense that modern man

may not hope to penetrate it. Both the Maya and the Aztec had their culture heroes, Kukulcan or Quetzalcoatl, whom they first deified, then surrounded with the aura of still more ancient sun myths, and endowed with attributes common to the beliefs of an agricultural people in regions where the beneficent rains are eventualities.

That the religious ideals evidenced by these symbols permeated the very lives and influenced every action of these ancient builders is clearly revealed by the symbolism of this feathered serpent that in its varied and conventionalized forms is ever present on structural base, carved approach and wall



The largest and most typical of all the serpent columns discovered in these ancient cities of Yucatan. This is one of the twin columns which formed the central supports of the fallen façade. Color in the crevices proves that they were painted. The feathered serpent as a religious symbol seems to have been to the New World what the cross was to the Old. It is found everywhere in architectural ornamentation from structural base to carved approach and façade

façade. The motive of the feathered serpent becomes therefore a highly important factor in the analysis of their work and the development of their ideas.

The twin columns that formed the central supports of this façade to be reproduced are the largest and most typical of all the serpent columns yet found among the ancient structures on the peninsula. The serpents' heads are over three feet six inches measured between the crotalid plates, four feet three inches high from base of lower jaw to crown of crotalid plate, and seven feet long from front of jaw to outer angle of the neck. The column proper from base plane to capital is eight feet two inches, the thickness of the capital is two feet, two inches, while the upper flare of the tail is fully four feet. The whole column is well carved, artistically covered in front with the flowing plumes of the quetzal bird. The crotalid head with its pronounced crotalid plates above the eyes, has all the distinctive marks of the crotalus or rattlesnake, but conventionalized through centuries of religious idealism. The inner back of the column corresponding to the belly of the serpent is marked with segments, like the serpent scales, but even these are sparingly overlaid with the smoothly flowing plumes of the sacred bird. The tail conventionalized into the capital has its front thickly covered with the plumes of the bird, while the surface underneath is carved into the conventionalized segments of the rattlesnake. Fragments of both tails lie scattered among the débris at the foot of the mole, beneath the temple for a distance of thirty feet or more. Portions of the rattles were found over three feet long, but large parts of both tails are so crushed and broken as to be unrecognizable. Enough has been secured however to make restoration possible.

The huge beams of Zapote wood that passed from end walls to the serpent columns and so helped to sustain the front façade, have entirely disappeared, and any hopes that I may have had of finding them among the fallen material were doomed to disappointment. It may be that they too were carried off to fill another purpose, either by Valladolid æsthetics or by even earlier vandals, for their dimensions would not have escaped notice.

The work of making the paper molds of the carved stone sections still in place on the temple platform and those still in place on the north façade was attended with some danger and much difficulty but great interest. The highest line of carved stones still in position was fully fifty sheer feet above the level of the general terrace. From the temple base on the level of the mole platform, large and heavy poles were bound together, as the natives well know how to do, while strong ropes held them upright and fast, and so permitted the framework of the scaffolding made of smaller poles to be erected. On this moving, shaking, yet perfectly safe scaffolding of poles, with not a nail or spike in the whole structure, we worked and made the molds.

The element of real danger was furnished by the disintegrating wall material and the loose stones of the grouting. These stone fragments were some of them quite large and had been placed by the ancient builders in the plastic mass of grouting much like the nodules in the pudding stone. The



Making the molds in a temperature of 130° F. was no easy task. The photograph shows the mold of the head completed. The serpent tail capital weighs nearly three tons

softer mortar wearing away with the erosion of the centuries has left the stones outcropping, at times falling of their own weight and always a constant factor of danger to those working beneath them. Then too the high winds and rain storms that prevailed at this season, while they aided the growing crops and made the luxuriant vegetation, also increased the difficulties of the undertaking in hand. Once we had the work on the northern façade all done, and well done it was too. The long sections were duly marked and noted, nothing remained but the hot sun to do its part in drying and hardening the plastic paper surface. Even while we were looking at it with tired backs but satisfied hearts, black cloud heads appeared in the east, they rose rapidly and hid the sun. We at once put the heavy tarpaulins over the molded surfaces fixing them in place by the iron force-

hooks, spreading clips, and screws especially made for the purpose. No use! for when the strong wind came it whipped the tarpaulins aloft, torn and split like so many handkerchiefs, while the drying paper molds once lying so smoothly and trim on the carved stone surfaces, were scattered far and wide as bits of paper over the tree tops.

The work was once more completed and this time Nature was in a more lenient mood. The sun did its work even as we did ours, and in the proper time, the molds duly prepared and rendered impermeable to moisture by



The completed sectional mold of the serpent column. Note the many pieces tied and wedged to await the drying and trimming process. Each separate piece weighs several hundred pounds. For shipping to New York the molds were packed with dry *zkusac* grass in cases of *xpasac* wood which had been cut in the forest and dried in the hot sun for months

varnishings, were packed and so made safe against all ordinary dangers and mishaps.

The description, delineation, measurements and molding of the façade portion still in place, and so capable of serving as guide in the restoration of the fallen façade, having been completed, the rest of the report deals with the accumulated material on the floor of the Ceremonial Court. Every cubic foot of this immense mass of fallen material must be carefully gone over, not a stone fragment however small is to be thrown aside without having been carefully examined.

The dimensions of the fallen façade having been determined, the zones of varied designs on the northern façade portion still in place, were measured, numbered and given names. For example: the "Frieze of the Jaguars and the Shields" was analyzed and its intent studied. By computation it was found that the frieze, if of unbroken continuity in front, should hold three shields and eight jaguars. In time the three shields were found, no more and no less; and enough jaguars or fragments of jaguars to complete the required number, thus the continuity of design on that line of frieze was logically established, and so on with the other bands. This was the task in the round. The problems involved were many and varied, the mere molding of the carved stones found being among the least of them.

Not only were the factors of displacement, fracture, and actual demolition to be considered, but others not subject to the natural laws of falling bodies. For instance, some time between 1721 and 1840, corrals were built and drinking troughs made on the plantation of the Chichen from stones some of which certainly were and others may have been taken from the falling façade. Again, during the middle of the last century, a strange microbe seems to have invaded the brain of a *Jefe Político* of the City of Valladolid, some thirty miles distant, and under its influence he sent carts and men to Chichen Itzá and took therefrom carved stones and serpents' heads, to adorn the plaza of Valladolid, and some of these at least came from the level space of the Ceremonial Court. As the carts went on through the forest road toward Valladolid some broke down under their heavy burdens and their contents still lay in the forest where they were dumped. Later, half a century later, some of these carved stones that did reach Valladolid were once more removed, taken to the *Museo Yucateco* at Merida, where they now are. All these incidents and many others not necessary to mention, made the task by no means an easy one, but for that reason the more fascinating.

The methods by which the undertaking has been accomplished, the details by which the final result has been obtained, are so varied that much of the original monotony of such hard labor was missing, and the interest of even the slowest-witted native on the work so awakened that they often of their own volition continued lugging and hauling, digging around some



An assembled carving made up of eight fragments which had been thrown apart at the time of the great crash centuries ago



The temple gains its name from a remarkable frieze of well-carved jaguars alternating with shields. This cut shows one shield and a portion of a second, and three jaguars [Compare with cuts pages 266 and 272]. Study of this façade still in place and computation of the dimensions of the fallen façade gave the conclusion that the frieze of the latter must have held three shields and eight jaguars. Exactly this number was found during the excavation

especially interesting carving, long after the hours when they would usually be swinging in their hammocks, in the cool shade of their palm-thatched homes.



Some particularly interesting carving would be unearthed — a little turning over in the hand, the fragment would fit into its place with other fragments and the workmen would go on with the digging

The tree trunks, matted roots and all the surface accumulation of centuries were carefully removed so as not to disturb the sequence, nor yet



The natives proved faithful workmen and became so interested that they often remained many hours overtime at the digging

to dislodge the delicate portions of carvings that the long, slender yet tenaciously strong rootlets might have grown into and wedged apart metres deep in the mingled mass of disintegrated mortar and worked stone sections.

Long years of experience with my work, have made good practical archaeologists of some of the workmen, not a fragment of carved stone, however small, within reason of course, escapes their keen eyes — a preliminary fumbling, a little turning over in the hand, a speculative eyeing of a

nearby fractured carving, and then the fragment fits into its place while the workman with a grunt of satisfaction goes on with his digging.

The making of the molds with the temperature at 130 in the sun and no shade available, is not precisely a recreation but all things that have a beginning have an end as well, and in time in spite of the obstacles seen and unforeseen, the undertaking was completed and the final processes of trimming, binding and waterproofing the paper molds commenced. Then the trunks of *xpasac* wood, that had been cut in the forest and drying for months, were sawn into inch boards and made up into strong wooden cases according to the measure of the various mold sections. Large quantities of *xkusac* grass, a very fine packing grass, had been cut, cured and stored, and with this the heavy plaster molds were packed so carefully and so securely that it seemed as if they could defy the efforts of the most reckless baggage-smasher and freight-wrecker.

Careful cartage over the rough frontier roads and careful handling under personal supervision at the port of Progreso, made more than probable the safe arrival of the twenty-seven large cases containing all the molds, both paper and plaster, to the store-rooms of the Museum, where they now lie *á la disposición de Ud.*



THE ROOSEVELT EXPEDITION TO SOUTH AMERICA

NEWS OF THE MUSEUM'S OTHER SOUTH AMERICAN WORK

By Frank M. Chapman

THE Museum's zoölogical explorations in South America, which during the past two years have produced such interesting results in the northern parts of that continent, now promise to be even more effectively prosecuted in southern South America, under the leadership of Colonel Theodore Roosevelt.

Colonel Roosevelt will sail for South America on October 4, and after delivering lectures in Rio de Janeiro, Buenos Aires and Santiago de Chile, will penetrate the interior of southern Brazil to study the country, its mammals and birds. There is no big-game hunting in the region which Colonel Roosevelt proposes to visit, and his expedition serves to emphasize his keen interest in natural history even more strongly than did his recent trip to Africa. Mr. George K. Cherrie and Mr. Leo E. Miller, both tried members of American Museum expeditions, will accompany Colonel Roosevelt as field assistants.

THE mountainous region at the headwaters of the Orinoco is, zoölogically, one of the least known areas in South America. Various attempts have been made to penetrate it but the obstacles presented by climate and transportation have not been wholly overcome.

Mr. L. E. Miller, who recently headed an American Museum expedition to this *terra incognita*, has more nearly achieved success than any of his predecessors, but through no fault of his, he was obliged to retreat just as he was about to reap the reward of two months' constant exertion and exposure to the dangers incident to travel on the Orinoco.

Mr. Miller, accompanied by Mr. F. X. Iglseider, as assistant and cartographer, left Ciudad Bolívar on December 17, 1912, in a small sloop bound for San Fernando de Atabapo. After a number of narrow escapes and the loss of one man, this remote settlement was reached January 28. On February 3, he reëmbarked with a mandioca-hunter, whom he was fortunate enough to encounter, for his destination, Mt. Duida, farther up the Orinoco. This mountain being unscalable from the Orinoco side (site of the now abandoned village of Esmeraldas), it was proposed to attack it from the west by ascending the Cunucunuma, a small river which flows into the Orinoco about twenty miles west of the junction of the Orinoco and Cassiquiare, and on March 4, camp was established at Boca Sina, some eight miles from the mouth of the Cunucunuma, and but two miles from the base of Duida.

Work was now begun on a trail through the forest to the mountain, but before it was completed Mr. Iglseider fell desperately ill with a complication of beriberi and malaria, and in order to save his life Mr. Miller was compelled to return with him to San Fernando and eventually to Cristóbal-Colón.



EXPLOURATION IN SOUTH AMERICA
Unloading equipment for transportation around falls in the Orinoco. Expedition of Mr. L. E. Miller

Some four hundred birds were collected on the upper Orinoco, but none were taken above an altitude of seven hundred feet at the base of Duida and the fauna of the mountain still remains unknown. Mr. Miller will probably renew his attempt to conquer it and the receipt of further collections will be awaited before attempting to report on the specimens already obtained. Six hundred specimens were secured at Cristóbal-Colón including a surprising number of species not found in Trinidad.

From Cristóbal-Colón on the Paria Peninsula (which was attacked by revolutionists shortly after Mr. Miller left it), Mr. Miller proceeded to Port of Spain, Trinidad, whence his collections were shipped to New York, and proceeded thence to Georgetown, British Guiana. Here he was greatly assisted by government officials in procuring the necessary permit to collect specimens and was soon established at Tumatumari near the junction of the Essequibo and Potaro Rivers. Under date of August 1, Mr. Miller reports that the surrounding primeval forests were proving most productive collecting ground and that in spite of a daily rainfall of between two and three inches, his collections were growing at the rate of about two hundred birds and mammals per week. October first, Mr. Miller is to sail from Georgetown for Barbados to join the Roosevelt expedition.

FIELD work in Ecuador, under Mr. Richardson has proved successful during the past season and a shipment of 1400 birds and mammals has just been received from him. These specimens were collected in part on the coast from the northern extension of the arid coastal zone of Peru and give us definite information of where this arid strip merges into the humid coastal region of northeastern Ecuador and western Colombia.

Mr. Richardson also collected in the luxuriant forests of the subtropical zone at an altitude of 6000 feet, in the temperate zone about Quito and the base of Pinchincha, and in the paramo or alpine zone of Pinchincha and Chimborazo, working on the latter mountain up to an altitude of 16,000 feet. Here Mr. Richardson secured specimens and accessories for a habitat group to represent the bird life of the upper life-zone of this famous volcano.

FROM Peru, the Museum's available study material has received an exceptionally important addition in the collections made by Mr. R. H. Beck for Mr. F. F. Brewster and Dr. L. C. Sanford. A large shipment lately received from Mr. Beck is particularly rich in little-known marine forms collected well off the coast of Peru, and in a beautifully prepared series of water-fowl from Lake Junín, situated at an altitude of 13,000 feet in the Peruvian Andes, which includes the Andean flamingo and many other species not heretofore represented in the Museum.

AMERICAN MUSEUM EXPEDITIONS FOR FOSSIL VERTEBRATES

By W. D. Matthew

THE American Museum expedition to Alberta in charge of Mr. Barnum Brown in search of Cretaceous dinosaurs, reports a very successful season. Nine dinosaur skulls and a correspondingly large series of skeletons or parts of skeletons have been secured. These all come from an older formation than those in which most of our Cretaceous dinosaurs have been obtained. Many, perhaps most of them, will be new to science, and we hope to recognize among them the ancestors of the horned dinosaur *Triceratops*, the armored *Ankylosaurus*, the duck-billed *Trachodon* and the carnivorous *Tyrannosaurus* which lived during the latest Cretaceous. Doubtless also we shall find among them others which left no descendants in the later fauna. The collection of over seventy boxes will soon be shipped to the Museum, and its preparation and study will be taken up during the winter. Mr. Brown regards this as the most successful season's work yet in his dinosaur campaign, bettering even last year's results.

Mr. Walter Granger, in charge of the American Museum expedition to the Eocene of New Mexico, has secured a fine collection of the very rare fossils from the Puerco formation of that region.

One of the most valuable portions of the Cope collection of fossil mammals purchased for the Museum by a number of the Trustees in 1894, was the collection from the Puerco formation. These were, and are, the most ancient mammals that we know much about; for the few remains of mammals that have been found in older formations are very fragmentary and exceedingly rare. With the Puerco fauna at the very beginning of the Age of Mammals commence the consecutive documentary records of the history of the evolution of the various kinds of higher quadrupeds. It is to palæontology what the Chaldæan records are to archæology.

Additions to the Cope collection of Puerco fossils were secured by the Museum expeditions of 1892 and 1896. Mr. Granger has now secured from the Lower or True Puerco horizon a collection equaling or exceeding in value all that the Museum possessed hitherto, and in addition a large series of specimens from the Torrejon or Upper Puerco horizon. Among the new specimens are a number of skulls and two or more skeletons. One specimen of *Ectoconus*, a primitive hooved animal about as large as a bull terrier, from the Lower Puerco is fairly complete and is the most ancient mammal skeleton ever found. Other skulls and partial skeletons of primitive hooved and clawed mammals are of scarcely less interest, and a number of specimens appear to belong to new genera and species. Altogether the collection is of remarkable scientific interest, and will provide material for a careful restudy of the Basal Eocene faunæ.

Among the most valuable prizes secured by last year's successful fossil expeditions were three skeletons of the gigantic and extraordinary "clawed ungulate" *Moropus*, a huge animal combining the proportions of a horse and a rhinoceros and with large curved claws on fore and hind feet. These skeletons were found by Mr. Albert Thomson in the great fossil quarry at Agate, Nebraska. This year Mr. Thomson continued work in the quarry hoping to find certain missing parts of the skeletons. Judging from his reports he has not only succeeded in finding most of the missing parts, but has discovered two or more additional skeletons equal to the best of those we had before. The Museum is now assured of the materials for a group of complete and finely preserved skeletons of this remarkable extinct animal.

MUSEUM NOTES

SINCE the last issue of the JOURNAL the following persons have been elected to membership in the Museum:

Fellow, MR. PAUL GRISWOLD HOWES;

Honorary Fellow, DR. LEONARD C. SANFORD;

Sustaining Member, MRS. EMILY N. HUYCK;

Annual Members, MRS. JOSEPH J. CORN, MRS. WILLIAM C. DICKERMAN, MRS. J. R. SIMON, MISS ALICE A. DELAMAR, REV. CHARLES L. GOODELL, DR. LOUIS C. LE ROY, DR. JAMES FRANKLIN NAGLE AND MESSRS. PAUL ARMSTRONG, EDWARD D. BETTENS, V. FORBIN, FERDINAND HANSEN, M. LEDERMAN, OSCAR LOWENSTEIN, B. FRANK MEBANE, WILLIAM STUBNER, FRANCIS J. SWAYZE, CHARLES WILSON TAINTOR and A. WILLSTATTER.

DR. ROBERT BROOME, the chief authority upon South African palæontology, is visiting America for a year of scientific research especially upon the ancient vertebrates of the Permian period. He has honored the American Museum by accepting a temporary appointment upon its staff for this purpose, and has brought with him his splendid private collection of South African Permian reptiles, one of the best yet brought together. While slightly surpassed in size by that of the British Museum it rivals that famous collection from a morphological and exhibition point of view. The comparative study of this collection and of the large collections in this Museum from the Permian of Texas and elsewhere, will yield results of great scientific value.

PROF. H. E. CRAMPTON devoted the summer to the completion of the first volume of reports on the "Evolution and Natural History of the *Partulæ* of Polynesia." This volume deals with about 24,000 adult snails, representing the fauna of Tahiti and it presents the evidence which demonstrates recent evolutionary changes in the species and varieties of the island.

DR. FRANK E. LUTZ, accompanied by Mr. Charles W. Leng, is in Cuba on an entomological collecting trip. After a period of study in Havana where unusual facilities for work were accorded by Prof. Carlos de la Torre, the expedition established field headquarters in Pinar del Rio. Dr. Lutz reports results which are valuable not only in extending knowledge of the fauna of Cuba itself, but also in establishing an evolutionary connection of the insects of eastern Cuba with those of southern Florida. Field work will be continued into October.

DR. W. K. GREGORY, assistant curator in the department of vertebrate palaeontology, attended the Birmingham meeting of the British Association for the Advancement of Science, having been invited to take part in the discussion on convergence in evolution. He also exhibited to the meeting some of the valuable specimens of early Tertiary lemuroids secured by our recent expeditions in the Eocene of Wyoming, with a discussion of their relationships to the various groups of Primates, living and extinct, and presented a paper by Dr. W. D. Matthew summarizing the important scientific results attained by the American Museum's expeditions in the Eocene formations during the last ten years, as conducted by Mr. Walter Granger.

REV. GILBERT L. WILSON of Minneapolis, a volunteer field-worker in anthropology, has just completed two months' study of the "zoöculture" of the Hidatsa-Mandan Indians in North Dakota. The term "zoöculture" is often used to designate all the relations between man and animals, especially such as are to any degree domesticated. Mr. Wilson reports the work unusually successful. His notes show that these people had worked out a detailed and definite body of knowledge for the breeding, training and use of dogs as traction animals. Later when horses were introduced among them, they worked out another system for that animal. The results of this study will be published by the American Museum.

MR. ALANSON SKINNER returned from a four months' collecting trip among the Indians of Manitoba and Wisconsin. While in Manitoba he made a detailed study of the so-called Plains-Ojibway, a group regarding themselves as independent of the Ojibway proper, and designating themselves as "Bungi," a name not heretofore appearing in ethnographical literature. Part of the Bungi reside on Turtle Mountain Reserve in North Dakota. The chief point of interest resulting from Mr. Skinner's observations is that these Ojibway present very clearly traits of culture pertaining both to the Central Algonkin tribes of the Eastern Woodlands and to the Plains Indians of the buffalo country to the west. The study of these transitional or mixed cultures is of great importance just now, because of the discussions between geographers and anthropologists as to the relation between geographical environment and culture. Also, such studies bear directly upon the theoretical problem as to whether a people gets its culture chiefly by borrowing it from others or by inventing it independently under the stimulus of similar conditions of life.

MESSRS. ROY W. MINER and H. MUELLER have recently returned from a collecting trip to Passamaquoddy Bay on the boundary line between Maine and New Brunswick. While in this region they obtained an extensive series of invertebrates for purposes of comparison with similar forms collected in recent years from more southern localities. Passamaquoddy Bay is an arm of the Bay of Fundy and is at the threshold of that region of great tides which at this point reach a height of twenty-eight feet above low water. Interesting observations were made in connection with the distinctness with which the faunal zones of life separate from each other in the "between-tides" area, as compared with the more condensed and overlapping condition of these zones in more southern waters, such as Casco Bay and the Woods Hole region where the rise of the tides is not more than ten and five feet respectively.

THE Charles S. Mason archæological collection from the vicinity of Jonesboro, Tennessee, has been presented to the American Museum by Mr. J. Pierpont Morgan. It contains several remarkable engraved shell gorgets and a number of unusual stone implements among which are two large exceptional celts. The entire collection came from one locality and thus constitutes an important addition to the Museum's series for the Eastern States.

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